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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/699,737	11/04/2003	Reiko Arai	520.43257X00	6438
20457	7590	09/30/2005	EXAMINER	
ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873			BERNATZ, KEVIN M	
			ART UNIT	PAPER NUMBER
			1773	

DATE MAILED: 09/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/699,737

Applicant(s)

ARAI ET AL.

Examiner

Kevin M. Bernatz

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☒ Claim(s) 6 and 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### ***Specification***

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

***The abstract should be in narrative form and generally limited to a single paragraph within the range of 50 to 150 words (37 CFR 1.72). See MPEP § 608.01(b).***

The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

2. The disclosure is objected to because of the following informalities: page 4, line 27 has the typographical error "id" instead of "is. Appropriate correction is required.

### ***Claim Objections***

3. Claims 6 and 13 are objected to because of the following informalities: claim 6 has a typographical error in line 2, "sad" instead of "said", and claim 13 has a

typographical error in line 6, "reratively" instead of "relatively". Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1 – 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Hikosaka et al. (U.S. Patent No. 5,942,342), as evidenced by Tanahashi et al. (U.S. Patent App. No. 2002/0048693 A1) and Iwasaki et al. (U.S. Patent No. 6,395,388 B1).

Regarding claim 1, Hikosaka et al. disclose a perpendicular magnetic recording medium (*Title*) comprising a soft magnetic underlayer (*Figure 5, elements 12 and 14*) and a perpendicular recording layer (*element 1*) which are deposited in this order over a substrate, said soft magnetic underlayer comprising a first soft magnetic layer (*element 12 adjacent element 11*), a domain control layer which includes at least an anti-ferromagnetic layer (*any of the middle element 14's and col. 9, line 1 bridging col. 11, line 26*), and a second soft magnetic layer (*second-most element 12 from the perpendicular layer 1*), wherein a ratio of  $d1/d2$  falls within a range of 0.3 to 1.5 (*col. 9, line 1 bridging col. 11, line 26*), and wherein the claimed property limitation of the coercivity  $H_c$  being smaller than the exchange bias field  $H_{ex}$  in the radial direction is explicitly taught (*col. 10, lines 4 – 10*).

Regarding claim 2, Hikosaka et al. disclose that the lowermost soft magnetic layer (i.e. applicants' "first soft magnetic underlayer") possesses a different exchange bias field than the other soft magnetic layers (the Examiner notes that the reason for this is that the uppermost and lowermost soft magnetic layers are only biased on one side by an antiferromagnetic layer 14, while the middle soft magnetic layers are biased on both sides by antiferromagnetic layers).

Regarding claim 3, Hikosaka et al. disclose antiferromagnetic layers meeting applicants' claimed thickness limitations (*col. 9, line 1 bridging col. 11, line 26*).

Regarding claim 4, Hikosaka et al. disclose crystalline materials suitable for the soft magnetic layers (*CoFeTa, NiFe and FeAlSi, as evidenced by Tanahashi et al. (Paragraph 0010) and Iwasaki et al.*).

Regarding claim 5, Hikosaka et al. disclose additional ferromagnetic layers meeting applicants' claimed structural limitations (*any of the additional elements 12 between the middle element 14 and the lowermost element 12*).

Regarding claim 6, Hikosaka et al. disclose amorphous materials suitable for the soft magnetic layers (*CoNbZr and CoTaZr as evidenced by Tanahashi et al. (Paragraph 0010)*).

Regarding claim 7, the limitation(s) "for controlling the orientation of magnetization of said anti-ferromagnetic layer" is (an) intended use limitation(s) and is not further limiting in so far as the structure of the product is concerned. Note that "in apparatus, article, and composition claims, intended use must result in a **structural difference** between the claimed invention and the prior art in order to patentably

distinguish the claimed invention from the prior art. ***If the prior art structure is capable of performing the intended use, then it meets the claim.*** In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art.” [emphasis added] *In re Casey*, 370 F.2d 576, 152 USPQ 235 (CCPA 1967); *In re Otto*, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963). See MPEP § 2111.02. In the instant case, the Examiner notes that since the orientation of the antiferromagnetic layers is in the radial direction, identical to the direction desired by applicant, that the extra ferromagnetic layers reading on the structural location of the “seed” ferromagnetic layer will necessarily meet the claimed limitations.

Regarding claims 8, 10 and 11, Hikosaka et al. disclose additional ferromagnetic layers meeting the claimed limitations as described above.

Regarding claims 9 and 12, Hikosaka et al. disclose thickness values of the soft magnetic layers meeting applicants' claimed limitations (*col. 9, line 1 bridging col. 11, line 26*).

Regarding claim 13, Hikosaka et al. disclose the nominal recording/reproducing apparatus limitations used for recording and reproducing from a perpendicular magnetic recording medium (*Figures 6 – 10 and col. 11, line 26 bridging col. 12, line 63*).

### ***Conclusion***

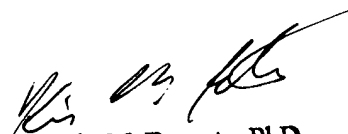
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on (571) 272-1284. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMB  
September 27, 2005



Kevin M. Bernatz, PhD  
Primary Examiner